

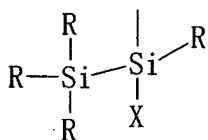
## CLAIMS

What is claimed is:

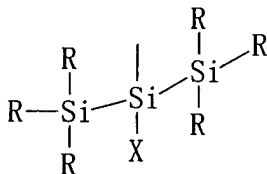
1. A composition suitable for formation of a spin-on antireflective layer comprising a silicon polymer having a plurality of reactive sites distributed along the polymer for reaction with a crosslinking component, and chromophore moieties; and

a crosslinking component, wherein said silicon polymer comprises  $\text{Si}-(\text{Si})_n$  moieties in the back bone or in the side group, wherein  $n$  is an integer of 1-15 and the  $\text{Si}-(\text{Si})_n$  moieties represent linear, branched or cyclic silanes, or any combination thereof.

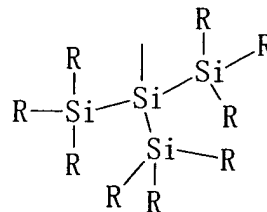
2. The composition of claim 1, wherein said  $\text{Si}-(\text{Si})_n$  moieties in the side group comprise formula I, II or III.



Formula I



Formula II



Formula III

wherein, R is each independently selected from an organic moiety, a halogen or a silane, and X is each independently selected from an organic moiety or a halogen, said organic moiety is substituted or unsubstituted hydrocarbon comprising linear or branched alkyl, aryl, halogenated linear or branched alkyl, halogenated aryl, cyclic alkyl, halogenated cyclic alkyl, or any combination thereof.

3. The composition of claim 1, further comprising an acid generator.

4. The composition of claim 3, wherein the acid generator is a thermal acid generator.
5. The composition of claim 3, wherein the acid generator is a photoacid generator.
6. The composition of claim 1, wherein said reactive sites are selected from the group consisting of alcohols, amino groups, imino groups, carboxylic acids, vinyl ethers, epoxides and mixtures thereof.
7. The composition of claim 1, wherein said chromophore moieties contain unsaturated carbon-carbon bonds.
8. The composition of claim 1, wherein said chromophore moieties contain linear alkyl, branched alkyl or cycloalkyl.
9. The composition of claim 1, wherein said crosslinking compound comprises a glycoluril compound.
10. The composition of claim 3, wherein said acid generator is a thermally activated acid generator.
11. The composition of claim 2, wherein said Si-(Si)<sub>n</sub> moieties is -Si-(Si-(CH<sub>3</sub>)<sub>3</sub>)<sub>3</sub>.
12. The composition of claim 1, wherein said reactive site is an alcohol group.
13. The composition of claim 1, wherein said chromophore is phenyl group.
14. A method of forming a patterned material feature on a substrate, the method comprising:

providing a material layer on a substrate,  
forming a organic underlayer over the material layer and then an antireflective/hardmask layer over the organic underlayer, said antireflective/hardmask comprising a polymer according to claim 1,  
forming a radiation-sensitive imaging layer over the antireflective/hardmask layer, and patternwise exposing the imaging layer to radiation thereby creating a pattern of radiation-exposed regions in the imaging layer,  
selectively removing portions of the imaging layer, the antireflective layer and the underlayer to expose portions of the material layer, and  
etching, electroplating, metal depositing or ion implanting the exposed portions of the material layer, thereby forming the patterned material feature.

15. The method of claim 14, wherein said antireflective/hardmask layer further comprising an acid generator.

16. The method of claim 14, wherein said polymer includes a plurality of reactive sites distributed along the polymer for reaction with a crosslinking component, and chromophore moieties, and a crosslinking component.

17. The method of claim 16, wherein said reactive sites are selected from the group consisting of alcohols, amino groups, imino groups, carboxylic acids, vinyl ethers, epoxides and mixtures thereof.

18. The method of claim 16, wherein said chromophore moieties contain unsaturated carbon-carbon bonds.

19. The composition of claim 16, wherein said chromophore moieties contain linear alkyl, branched alkyl or cycloalkyl.

20. The method of claim 15, wherein said acid generator is a thermally activated acid generator.
21. The method of claim 15, wherein said acid generator is a photoacid generator.
22. A method of forming a patterned material feature on a substrate, the method comprising:
- providing a material layer on a substrate,
  - forming an antireflective/hardmask layer over the metal layer, said antireflective/hardmask comprising a polymer according to claim 1,
  - forming a radiation-sensitive imaging layer over the antireflective/hardmask layer, and patternwise exposing the imaging layer to radiation thereby creating a pattern of radiation-exposed regions in the imaging layer,
  - selectively removing portions of the imaging layer, and
  - etching, electroplating, metal depositing or ion implanting the exposed portions of the material layer, thereby forming the patterned material feature.
23. The method of claim 22, wherein said antireflective/hardmask layer further comprising an acid generator.
24. The method of claim 22, wherein said polymer includes a plurality of reactive sites distributed along the polymer for reaction with a crosslinking component, and chromophore moieties, and a crosslinking component.
25. The method of claim 24, wherein said reactive sites are selected from the group consisting of alcohols, amino groups, imino groups, carboxylic acids, vinyl ethers, epoxides and mixtures thereof
26. The method of claim 24, wherein said chromophore moieties contain unsaturated

carbon-carbon bonds.

27. The composition of claim 24, wherein said chromophore moieties contain linear alkyl, branched alkyl or cycloalkyl.

28. The method of claim 24, wherein said acid generator is a thermally activated acid generator.

29. The method of claim 24, wherein said acid generator is a photoacid generator.